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Imagery rescripting for social anxiety disorder via internet videoconferencing: An open trial

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ABSTRACT

Imagery rescripting (ImR) has demonstrated efficacy in reducing symptoms of social anxiety disorder (SAD). However, there are many logistical and psychological barriers that prevent individuals with SAD from accessing treatment. The efficacy of remote treatment methodologies, such as internet videoconferencing, has recently been demonstrated across a range of mental disorders. However, the efficacy of videoconferencing-delivered ImR (vImR) has not yet been examined. The present study aims to examine the efficacy and acceptability of vImR for SAD in a multiple baseline trial utilising the waitlist control group from a larger randomised controlled trial (RCT). 35 participants (M_{age} = 37.86; SD = 12.90) received no intervention for 8-weeks, then received an 8-session manualised vImR treatment protocol. Within-group analyses indicated negligible effect sizes from baseline to pre-treatment (SIAS-6: d = 0.22; 95 % CI: 0.25 – 0.69; SPS-6: d = −0.03; 95 % CI: 0.49 – 0.44). Large effect sizes were found from pre-treatment to post-treatment (SIAS-6: d = 0.81; 95 % CI: 0.32–1.29; SPS-6: d = 0.80; 95 % CI: 0.30–1.27) and pre-treatment to 3-month follow-up (SIAS-6: d = 0.85; 95 % CI: 0.36–1.33; SPS-6: d = 0.90; 95 % CI: 0.40–1.38). At post-treatment, 66 % of participants no longer met criteria for SAD (74 % at 3-month follow-up). Benchmarking analyses indicated similar treatment effect sizes to in-person ImR for SAD. Participants rated the program as highly acceptable. The results indicate that the mechanisms of ImR appear to be transferable to vImR and therefore this may be a viable remote treatment option for individuals with SAD who do not respond to first-line treatments.

1. Introduction

Social anxiety disorder (SAD) is one of the most commonly diagnosed mental health disorders with a lifetime prevalence rate of 12 % (Stein et al., 2017). The disorder is characterized by an excessive fear of negative evaluation or judgement from others in social situations, which results in either avoidance or enduring the social situation with intense distress (American Psychiatric Association, 2022). The mean age-of-onset of SAD is in adolescence (Stein et al., 2017), with the vast majority of cases developing in individuals by their twenties (Kessler et al., 2009; Stein et al., 2017). SAD is disabling and patients often have significantly impaired functioning across multiple domains (Koyuncu et al., 2019). Comorbidity with other disorders has reached up to 90 % in some studies (Koyuncu et al., 2019) with many people who meet criteria for SAD also meeting criteria for secondary mental health conditions, such as depressive disorders, other anxiety disorders, or substance use disorders (Crome & Baillie, 2015; Koyuncu et al., 2019).

The Spence and Rapee (2016) etiological model of SAD suggests that various environmental, genetic, temperamental, and proximal risk factors can impact the development of social anxiety symptoms. One prominent environmental risk factor for developing SAD is negative life experiences, whereby circumstances and experiences promote a sense of threat in the environment or diminish confidence in one's ability to cope in the face of challenge (Rapee et al., 2023). These threats and challenges may include emotional and physical abuse or neglect (Fritz et al., 2018), peer victimisation (Cohen & Kendall, 2015; Hunt et al., 2022), or an overcontrolling parenting style (Yap & Jorm, 2015). Previous research has found that socially negative experiences in particular (e.g., peer victimisation, exclusion, humiliation) may be the most proximal risk factor for the development of SAD (Norton & Abbott, 2017). As a

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result of these adverse life experiences, it is suggested that strong negative self-beliefs and imagery that is greatly distressing and intrusive emerge in individuals with SAD, which limit opportunities for the development of positive and protective peer relationships (Hackmann et al., 2000; Reimer & Moscovitch, 2015). A distinguishing feature of SAD is the level of detail with which aversive memories and mental imagery simulations are retrieved and reconstructed, and the painful and humiliating experiences that are replayed before, during and after social encounters (Hackmann et al., 2000; Moscovitch et al., 2023; Reimer & Moscovitch, 2015).

1.1. Imagery rescripting (ImR) for SAD

Imagery rescripting (ImR) is a series of therapeutic imagery techniques delivered in phases that supports individuals to update the negative beliefs, self-imagery and meaning embedded in aversive autobiographical memories (Arntz & Weertman, 1999; Wild & Clark, 2011). In the case of SAD, ImR requires the patient to identify a key negative autobiographical memory in which the patient has perceived social scrutiny, and then the clinician and patient work together to rescript the memorized representations of unpleasant or traumatic experiences and associated negative core beliefs or schemas (Romano et al., 2020). Thus, this 'schema-incongruent' learning during treatment triggers a prediction error to the existing schema, which generates and strengthens new and adaptive core beliefs or schemas (Moscovitch et al., 2023). For example, rather than the patient holding the negative schema of "I'm flawed", the patient might experience a schema-incongruent "I am capable in social situations" through highly detailed imagery techniques which is then further reinforced through practice and consolidation. Importantly, ImR is not the replacement of original memories with false memories, rather the creation of more functional meanings which leads to a reduction of negative self-beliefs (Mancini & Mancini, 2018) and an increase in perceptions of mastery and self-efficacy (Kunze et al., 2019).

Although there is limited evidence regarding the mechanisms of change in ImR (Strachan et al., 2020), modern learning theory is often used as a framework with two main competing theories. One such theory is competition retrieval hypothesis (Brewin et al., 2010). This theory suggests that by using rescripting to create an alternative image, when representational systems are triggered, the alternative image is more memorable and can be retrieved over the former negative memory (Brewin, 2015; Brewin et al., 2010). Alternatively, the US revaluation theory suggests that ImR intervention provides new information and meaning through the use of positive imagery and affect, changing the unconditioned stimulus (the mental imagery) so that a more adaptive response occurs when triggered by a conditioned stimulus such as an external stimuli or intrusive thought (Arntz, 2011, 2015; Arntz & Weertman, 1999; Dibbets et al., 2018). Both theories support the importance of mental imagery in informing emotions, cognitions and behaviours, and that rescripting imagery yields changes in mental representations and response. In SAD specifically, ImR targets psychological mechanisms that are hypothesized to maintain SAD symptoms, particularly negative core beliefs and self-imagery that result from aversive life experiences (Strachan et al., 2020).

Imagery rescripting (ImR) has demonstrated efficacy in the reduction of SAD symptoms (Kroener et al., 2023; Lloyd & Marczak, 2022; Romano et al., 2020; Takanashi et al., 2020) as well as in other mental disorders associated with aversive memories such as posttraumatic stress disorder, depression, and eating disorders (Kip et al., 2023; Kroener et al., 2023). The delivery of ImR is included in individual CBT for SAD based on the Clark and Wells (1995) model and supported by the National Institute for Health and Care Excellence (2013) guidelines. ImR for SAD has been delivered as a brief standalone treatment (Knutsson et al., 2020; Norton & Abbott, 2016; Reimer & Moscovitch, 2015; Wild et al., 2008) and as an adjunct to CBT (Lee & Kwon, 2013; Norton et al., 2021; Takanashi et al., 2020). Morina et al. (2017) completed a meta-analysis of six trials of various designs (RCT, open trial and case series) of ImR for SAD and found large within-group effect sizes from pre-treatment to post-treatment (g = 1.22) and pre-treatment to follow-up (g = 1.79) on SAD symptom measures. A more recent meta-analysis by Kroener et al. (2023) included nine RCTs of brief ImR (e.g., 1–2 sessions) and found a medium within-group effect sizes from pre-treatment to post-treatment (g = 0.72) despite the reduced amount of therapist time. Currently, the majority of the literature on the efficacy of ImR for SAD focuses on interventions that are brief, and to date only one case series study (Frets et al., 2014) has investigated the efficacy of ImR in more than three sessions. Thus, our understanding of the impact of ImR as a standard-length treatment for SAD is currently unknown.

1.2. Remote ImR treatment for SAD

Access to evidence-based treatment provided by qualified clinicians is important to counter the direct and indirect costs of SAD including the adverse life course outcomes (Andrews et al., 2004). However, there are many known logistical and psychological barriers for individuals experiencing SAD that prevent them from accessing treatment. Logistical barriers preventing individuals from seeking help include long waitlists, distance and lack of local providers, knowing where to seek help and financial limitations, whilst psychological barriers include the distress associated with fear of what others may think or say, needing to attend a clinic in person, and the feeling of shame associated with SAD (Black et al., 2023; Olfson et al., 2000).

During the COVID-19 pandemic, travel restrictions made attending in-person treatments difficult or impossible and many clinicians were required to deliver psychological therapies remotely. Remotely delivered treatments provide additional opportunities for individuals with SAD to access treatment and reduces many of the abovementioned barriers to treatment. Videoconferencing platforms (e.g., Zoom) allow for a mostly seamless transition from in-person face-to-face treatment to online face-to-face treatment through its synchronous communication that includes both verbal and non-verbal information. A recent RCT of internet-delivered videoconferencing CBT for SAD demonstrated that evidence-based treatment can be effectively delivered through this methodology with good acceptability from participants (Winter et al., 2025). Smaller, uncontrolled trials have yielded similar findings (Matsumoto et al., 2018).

Despite the efficacy of remotely delivered CBT for SAD, a range of key clinical considerations have been proposed for therapists and clients working with aversive or traumatic autobiographical memories (Paulik et al., 2021) that may impact the transition of ImR from in-person to videoconferencing-delivered (vImR). These include perceived and real safety, access to strong internet connection and a device with a camera, preparation of the therapeutic space and strategies to monitor and respond to emotions and dissociation (Paulik et al., 2021). To date, vImR has only been examined in a small number of exploratory studies including with non-clinical samples (Tenore et al., 2022), and disorders such as posttraumatic stress disorder (Bachrach et al., 2022), obsessive-compulsive disorder (OCD) (Cooper et al., 2023; Kühne et al., 2025), and eating disorder prevention (Pennesi & Wade, 2018). Firstly, Tenore et al. (2022) investigated the viability of vImR in a group setting with 52 participants recruited from a university sample (13 % had previously received a psychiatric diagnosis). The study examined the effectiveness of three sessions of group vImR to improve cognitions and emotions based on a negative childhood memory (Tenore et al., 2022). In this preliminary study participants reported they were able to immerse in the mental image, their affective state changed and reported reduced arousal regarding the memory, and that their needs were met during vImR. This suggests initial viability of vImR. Secondly, Bachrach et al. (2022) examined the efficacy of vImR for childhood posttraumatic stress disorder in a case study. The treatment consisted of seven sessions, two of which were in-person prior to the home confinement regulations of the COVID-19 pandemic, and the remaining five conducted with vImR

(Bachrach et al., 2022). This case study illustrated the successful application of vImR with no apparent negative impacts on the effectiveness, quality of treatment, treatment protocol or patient satisfaction compared to in-person ImR treatment. Indeed, recent studies exploring remote-delivered ImR for OCD show mixed results. Cooper et al. (2023) found significant anxiety and fear reductions in a self-guided format, while Kühne et al. (2025) reported minimal effects compared to controls. These studies of vImR and online self-guided ImR highlight the limited research on remote ImR interventions and underscore the need for further studies.

1.3. The present study

Despite the prevalence of SAD in the community, the growing evidence-base of ImR for SAD in in-person settings, and the emergence of videoconferencing remote treatment, there are currently no clinical trials examining the efficacy of vImR for SAD, or any other mental health disorder. The present study utilises the waitlist control group from a larger RCT (Winter et al., 2025) and is the first known examination of the efficacy and acceptability of vImR treatment for SAD that is comparable to a course of cognitive behaviour therapy (e.g., 8 sessions). Based on the limited existing literature, it is hypothesized that (1) vImR will result in significant reductions in symptoms, resulting in large within-group effect sizes from pre-treatment to post-treatment and pre-treatment to follow-up; (2) vImR for SAD will result in similar reductions to standard in-person ImR; and (3) vImR will be acceptable to individuals with SAD.

2. Methods

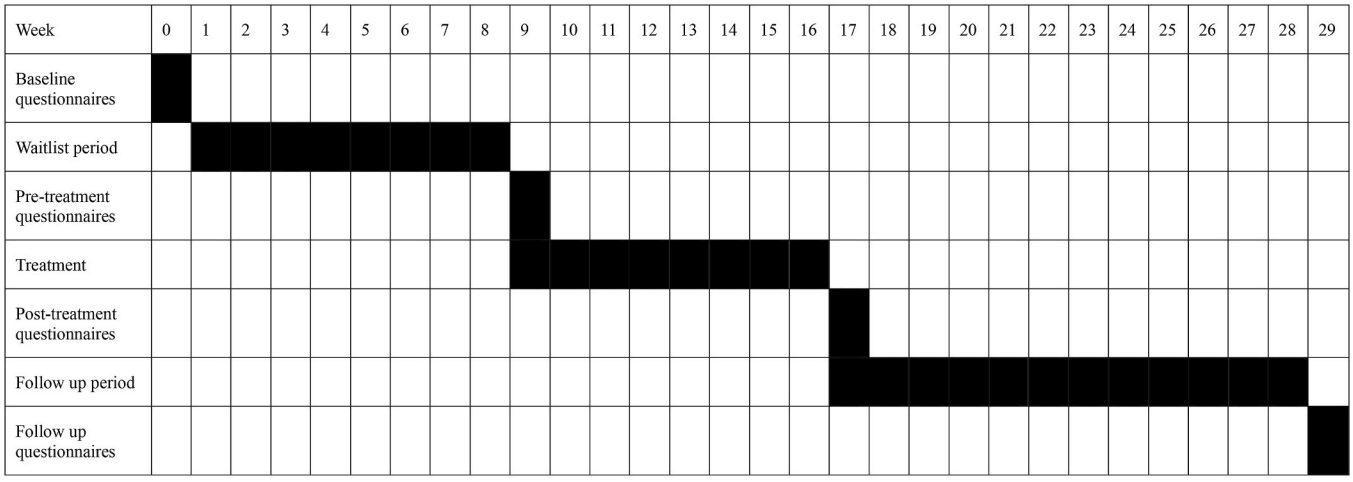
2.1. Design

A multiple baseline open trial design was used to assess the study hypotheses using the waitlist control group from a previous RCT examining the efficacy of videoconferencing-delivered CBT for SAD (Winter et al., 2025). The larger study combined with this follow-on uncontrolled trial was prospectively registered with the Australian and New Zealand Clinical Trials Registry (ACTRN12623000313639) and the study protocol for the RCT also outlining this uncontrolled trial was published (Winter et al., 2023). Given that this is the first examination of vImR for SAD and an exploratory study as part of a progressive and cumulative science, an open trial design was considered appropriate. Results were compared from baseline to pre-treatment (no treatment or waitlist control phase), as well as pre-treatment to post-treatment and pre-treatment to three-month follow-up. All individuals provided informed consent prior to study participation. An overview of the study design is outlined in Fig. 1.

2.2. Participants

Participant flow is outlined in Fig. 2. In total, 353 participants provided consent and commenced the online screener, of whom 112 were additionally screened using video-conferencing software Zoom (Zoom, 2024) to determine their diagnostic status and any comorbid conditions. A total of 78 participants were randomised into two groups as described in the original RCT (Winter et al., 2025). The 39 participants randomised into the vImR treatment were initially waitlisted for 8-weeks as a waitlist control group from the original study, then received an 8-week course of vImR as described in the present study. Four participants withdrew after the waitlist period prior to completing the pre-treatment questionnaire; therefore 35 participants were included in the analyses. Of the 35 participants who commenced treatment, 54.3 % were female, 42.9 % were male, and 2.9 % identified as non-binary or gender diverse. The mean age was 37.86 (SD = 12.90). Demographic and clinical characteristics of the sample are presented in Table 1.

The study was approved by the University of Technology Sydney Health and Medical Research Ethics Committee (UTS MREC REF NO. ETH22-7803). Detailed information on the inclusion and exclusion criteria can be seen in the published protocol (Winter et al., 2023), however briefly, participants were required to be 1) living in Australia, 2) aged 18 or above, 3) fluent in English, 4) meet criteria for SAD as their primary diagnosis on the DIAMOND (Tolin et al., 2018), 5) be medication free or on a stable dose of psychotropic medication, and 6) not currently receiving regular psychological treatment for the SAD symptoms. Additionally, participants were excluded if they 1) had severe depressive symptoms (a score of 20 or above on the PHQ-9; (Kroenke et al., 2001), 2) were at risk of suicide (defined as a score of '2' or more on item 9 of the PHQ-9 (Kroenke et al., 2001); or a via clinician judgement using the Columbia Suicide Severity Rating Scale; (Posner et al., 2011), 3) used alcohol or illicit drugs on a daily basis, 4) were diagnosed with a schizophrenia spectrum disorder or had significant cognitive or intellectual impairment, 5) had a medical condition that may interfere with treatment, or 6) did not have access to a computer with a camera and stable internet or were unwilling to engage in treatment using internet-videoconferencing software.



Note. During the waitlist period participants were not provided with any treatment or support. Mid-treatment questionnaires were delivered in week 12, after the fourth session.

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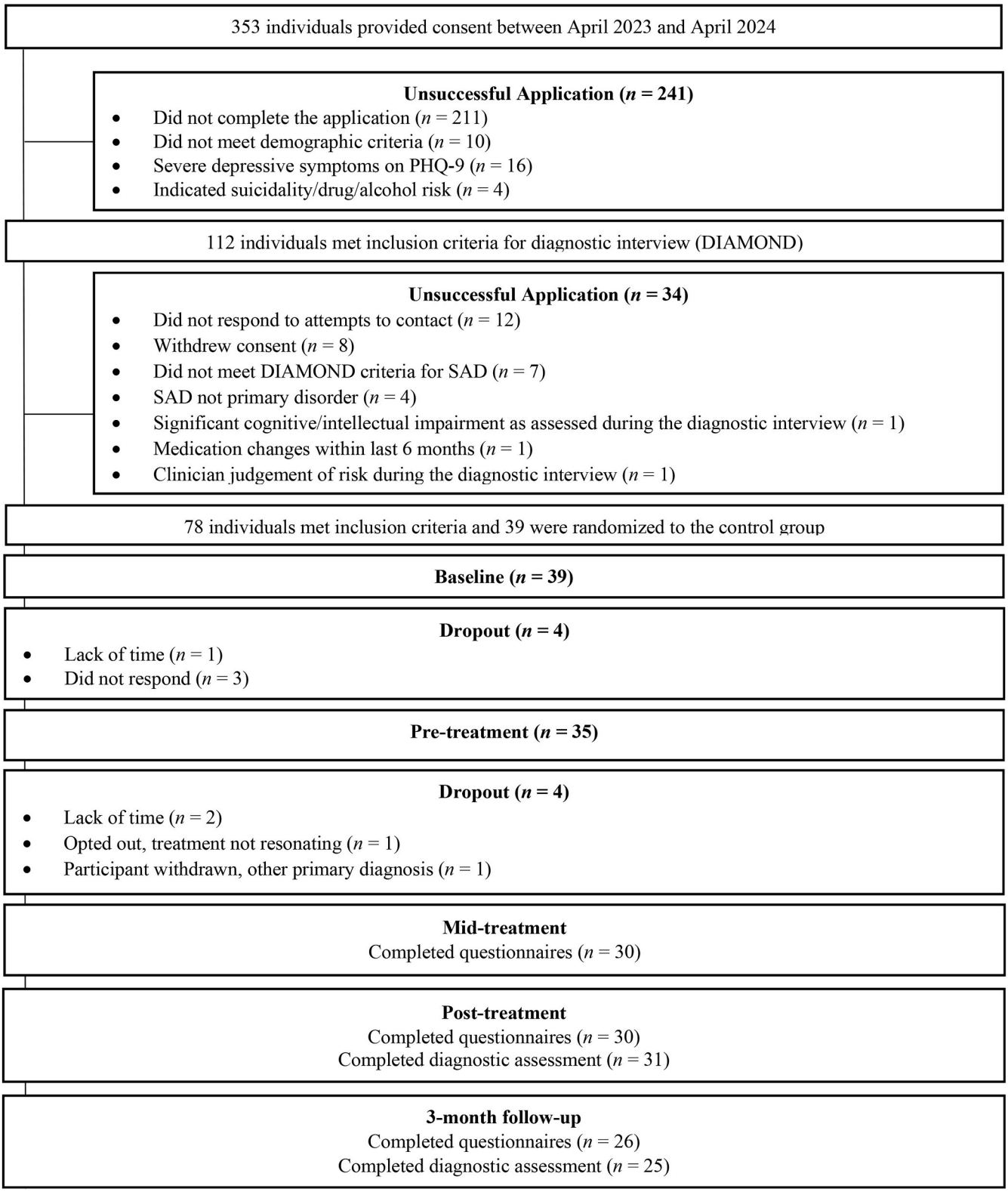

Note. DIAMOND: Diagnostic Interview for Anxiety, Mood, and Obsessive-Compulsive and Related Neuropsychiatric Disorders, PHQ-9: Patient Health Questionnaire-9 item.

Fig. 2. Participant flow chart
Note. DIAMOND: Diagnostic Interview for Anxiety, Mood, and Obsessive-Compulsive and Related Neuropsychiatric Disorders, PHQ-9: Patient Health Questionnaire-9 item.

Table 1
Characteristics of the total sample (N = 35).

Variable	n	%
Gender		
Female	19	54.3
Male	15	42.9
Non-binary/gender diverse	1	2.9
Age		
Mean (SD)	37.86 (12.90)	–
Range	19–63	–
Marital Status		
Single	18	51.4
Married/de facto	15	42.9
Divorced/separated/other	2	5.7
Education		
Highschool	8	22.9
Trade certificate/diploma	4	11.4
Bachelor's degree	18	51.4
Master's/Doctoral degree	5	14.3
Employment		
Full time	11	31.4
Part time/casual	5	14.3
Student	8	22.9
At home parent	1	2.9
Unemployed/seeking work	6	17.1
Registered sick/disabled	3	8.6
Retired	1	2.9
Medication (% yes)	12	34.3
Comorbidities		
Obsessive compulsive disorder	2	5.7
Body dysmorphic disorder	2	5.7
Hoarding disorder	2	5.7
Excoriation disorder	1	2.9
Generalized anxiety disorder	8	22.9
Panic disorder	3	8.6
Agoraphobia	10	28.6
Specific phobia	1	2.9
Major depressive disorder	5	14.3
Persistent depressive disorder	2	5.7
Adjustment disorder	1	2.9
Binge eating disorder	1	2.9
Bulimia nervosa	1	2.9
Somatic symptom disorder	2	5.7
Substance use disorder	2	5.7
Attention deficit/hyperactivity disorder	2	5.7
DIAMOND SAD severity		
Mean (SD)	5.00 (0.59)	
SAD Age of onset*		
Mean (SD)	15.68 (11.58)	

*$N = 34$ (numerical age of onset data for 1 participant was not recorded).

2.3. Measures

2.3.1. Diagnostic assessment

Diagnostic Interview for Anxiety, Mood, Obsessive-Compulsive and Other Neuropsychiatric Disorders (DIAMOND) (Tolin et al., 2018).

The DIAMOND is a semi-structured clinical interview assessing the DSM-5 diagnostic criteria for anxiety disorders, mood disorders, obsessive-compulsive and related disorders, trauma and stressor related disorders, schizophrenia spectrum disorders, eating disorders, somatic symptom and related disorders, substance use disorders, and selected neurodevelopmental disorders. For the SAD diagnosis specifically, the DIAMOND demonstrates very good interrater reliability (kappa = 0.70) and excellent test-retest validity (kappa = 0.86) (Tolin et al., 2018). Clinicians administering the DIAMOND were either provisionally registered (i.e., Master of Clinical Psychology students in their final year of training) or fully registered psychologists under the supervision of an experienced clinical psychologist. Assessing clinicians completed 3-h of online training and the interrater reliability across all diagnostic modules at post training ranged from 0.68 to 0.89 across clinicians. Interrater reliability was not assessed in this study.

2.3.2. Primary outcome measures

Social Interaction Anxiety Scale and Social Phobia Scale – Short Form (SIAS-6 and SPS-6) (Mattick & Clarke, 1998). The SIAS-6 and SPS-6 are a companion set of measures designed to assess two similar yet distinct aspects of social anxiety which constitute the core features of the disorder (Heidenreich et al., 2011; Peters et al., 2012). Specifically, the SIAS-6 focuses on the more generalized social interaction anxieties (e.g., *"I tense up if I meet an acquaintance on the street"*, whilst the SPS-6 targets specific scrutiny fears (e.g., *"I worry I might do something to attract the attention of other people")* (Peters et al., 2012). The short forms are self-report measures, each comprised of six items rated on a 5-point Likert scale ranging from 0 (not at all characteristic or true of me) to 4 (completely characteristic or true of me). Scoring on both measures is completed by summing each item to receive a total score. The short forms have demonstrated sound psychometric properties with adequate to good internal consistency (α = 0.75 - 0.85), convergent and discriminant validity, diagnostic discrimination, test-retest reliability and treatment sensitivity as found in previous studies (Le Blanc et al., 2014; Peters et al., 2012). The internal consistency in the current sample was α = 0.73 for the SIAS-6 and α = 0.88 for the SPS-6.

2.3.3. Secondary outcome measures

Social Anxiety Disorder Dimensional Scale (SAD-D) (LeBeau et al., 2012). The SAD-D is a self-report tool consisting of 10-items designed to assess the severity of social anxiety disorder symptoms. It is the most contemporary measure of SAD symptoms and reflects the most current criteria for diagnosis. Each item is scored on a five-point Likert scale ranging from zero ("never" or "none") to four ("all the time" or "extreme") on items including *"During the past 7 days, I have felt anxious, worried, or nervous about social situations"*. Scoring on this measure is completed by summing each item to receive a total score. The SAD-D has demonstrated good validity and internal consistency in previous samples (LeBeau et al., 2016), including within an Australian community sample (Binasis et al., 2022; Rice et al., 2021), and good to excellent test-retest reliability (Binasis et al., 2022). In the current sample, the internal consistency was α = 0.81.

Patient Health Questionnaire – 9 item (PHQ-9) (Kroenke et al., 2001). The PHQ-9 is a commonly used tool consisting of 9-items to assess depressive symptoms. This outcome measure of depression was included due to the high comorbidity between SAD and depression (Koyuncu et al., 2019). Items refer to experiences of depressive symptoms over the last 2 weeks including *"Over the last 2 weeks I have been bothered by feeling down, depressed, or hopeless"*. Each item is rated on a four-point Likert scale from 0 to 3 (0 = not at all, 1 = several days, 2 = more than half the days, 3 = nearly every day). Each item is summed to receive a total score and the total score of these nine items indicates the severity of depression, with scores of 10 or above suggesting clinically significant depression (Manea et al., 2012; Zuithoff et al., 2010). The PHQ-9 has been shown to have excellent psychometric properties including internal consistency, test-retest reliability and discriminative validity (Costantini et al., 2020; Zuithoff et al., 2010). In the current sample, the internal consistency α = 0.84.

NIMH Clinician Global Impression (CGI) Scale (self-report version) (Guy, 1976). The CGI is a commonly used tool to measure severity of symptoms. It examines the self-reported experience of clinical severity associated with disorders and seeks to represent improvement and achievement of normative functioning over and above symptom improvement. Participants are asked to indicate *"Over the past week, how severe were your symptoms of social anxiety disorder"*. Severity scores range from 1 (normal) to 7 (severely ill) and improvement scores range from 1 (very much improved) to 7 (very much worse). Studies have shown that CGI ratings are positively correlated with both self-report and clinician-administered measures of symptom-specific

improvement in individuals with social anxiety disorder, demonstrating good test-retest reliability (Zaider et al., 2003).

*Sheehan Disability Scale (SDS) (*Sheehan, 1983*).* The SDS is a widely used 3-item measure that evaluates the impact of psychiatric symptoms on work, social, and home life functioning. It seeks to illuminate the self-reported experience of disability associated with the disorder. For example, participants are asked *"to what extent have your social anxiety disorder symptoms disrupted your social life/leisure activities"*. Scores range from 0 (not at all) to 10 (extremely) on each item and total scores are determined by summing each item. A cut score of 5 on any item has been used to identify individuals with clinically relevant symptoms in previous studies (Leon et al., 1992), demonstrating high reliability in primary care settings (Leon et al., 1997). Additionally, it has been validated as an effective tool for studying disability in SAD (Aderka et al., 2012; Hambrick et al., 2004).

2.3.4. Process/acceptability measures

*Client Satisfaction Questionnaire (CSQ) (*Larsen et al., 1979*).* The CSQ is an 8-item measure of the participant's satisfaction with the treatment they were provided. Participants are asked questions such as: *"How would you rate the quality of service you have received?"; "To what extent has our treatment met your needs?"; "Have the services you received helped you deal more effectively with your problems?"*. The scale has demonstrated adequate psychometric properties in previous studies (Kelly et al., 2018) and has wide-ranging use in primary care medical and mental health treatment (Attkisson & Greenfield, 2004).

Acceptability Questionnaire (AQ). The AQ is a 10-item tool used to assess the acceptability of remote treatments. Participants are asked items such as: *"How satisfied were you with treatment?"; "Was taking part in this treatment worth your time?"; "Would you recommend the treatment to others with similar symptoms?"*. The questionnaire has been used in other remote treatments (Trenoska Basile et al., 2024; Wootton et al., 2019).

2.4. Treatment

Treatment was provided from a university outpatient clinic in Australia utilising videoconferencing software Zoom (Zoom, 2024) and followed a manualised vImR treatment program. The program consisted of 4 modules covering the following domains: (1) psychoeducation (one session); (2) identification and exploration of negative self-imagery and identification of core beliefs (one session); (3) ImR of aversive memories related to social anxiety (five sessions); (4) relapse prevention/consolidation (one session). The second module functioned as an assessment process around imagery and relevant memories to not only provide a starting point for treatment, but also to support participants to understand the relationship between early experiences, imagery and current anxiety. The treatment was administered by an assigned online clinician in eight weekly sessions of 50 min each. All clinicians were either provisionally registered or fully registered psychologists under the supervision of an experienced clinical psychologist. To ensure treatment fidelity, treating clinicians received weekly supervision to review client progress and address clinical issues arising from sessions. All sessions were recorded and at least 10 % of sessions were randomly selected for review of treatment adherence and integrity checking.

The ImR procedure was drawn from the Arntz and Weertman (1999) protocol of three phases and the Wild and Clark (2011) protocol specifically for SAD. In phase 1, participants relived their socially aversive memory from the perspective of their younger self at the age at which it occurred, pausing at what was deemed by the participant as the critical incident or "hot spot". In phase 2, participants continued the memory from the critical incident from the perspective of their current self, observing and interacting with their past self. During phase 2, participants were asked to intervene as their current self and provide their past-self with words or actions that changed the meaning of the memory. This may include confronting perpetrators, speaking with other people in the memory, or providing corrective information to their past-self. This approach infers that the participant has a strong enough 'healthy adult' who is able to intervene and meet the emotional needs of their younger self, similar to the findings of Romano et al. (2021). However, if the participant required additional scaffolding, a significant other or the therapist entered in image to ensure that healthy options of meeting the needs of the younger participant were available. In phase 3, the participant relived the incident again from the perspective of their past-self and experienced the actions from their current self in phase 2. During this phase, the past-self could also ask the current self for additional needs to be met. The rescripting process ends once the past-self communicates to the therapist that all their emotional needs have been met. After the ImR procedure, the therapist facilitated a conversation with the participant about new meanings taken from the rescripted memory.

2.5. Procedure

Participants were recruited between April 2023 and April 2024. Participants were recruited through a variety of paid and unpaid posts on social media, professional networking websites, and hard copy flyers posted on community noticeboards. From these advertisements participants were directed to an online participant information sheet and consent form and commenced the online screening. Those who met the initial eligibility criteria completed a videoconferencing assessment using the DIAMOND (Tolin et al., 2018) and eligible participants were then randomised. Participants received no treatment for 8-weeks and were then provided with 8-sessions of vImR. Participants completed the self-report questionnaires at baseline, pre-treatment, mid-treatment, post-treatment, and 3-month follow up using REDCap (Harris et al., 2009, 2019). The diagnostic interview was repeated at post-treatment and 3-month follow up. Participants were not compensated for participation in the study.

2.6. Statistical methods and analysis

The present study was powered *apriori* for the purpose of the original RCT and is available in the published protocol (Winter et al., 2023). An additional power analysis was conducted *post hoc* using GLIMMPSE (Kreidler et al., 2013) for the purposes of ensuring sufficient power at 0.82 for the present study. The additional power analysis was completed as four participants withdrew or were unable to be contacted after the waitlist period before treatment, thus the final sample size was marginally smaller than anticipated and the researchers wanted to ensure sufficient power to detect a large effect size. All analyses were performed using IBM SPSS Statistics (Version 29). Demographic data, treatment adherence and acceptability, and dropouts were examined using descriptive statistics and independent t-samples with Bonferroni corrected p-values where appropriate. The primary analyses of treatment outcomes used conservative intention-to-treat principles and mixed-linear models analyses. Analyses employed a covariance structure and maximum likelihood estimation, providing unbiased estimates where there was missing data under the assumption that data was missing at random (Cnaan et al., 1997). Sensitivity analyses were also used to evaluate potential impact of missing data on the findings. Sensitivity analyses were conducted using treatment data of participants who completed post-treatment and follow-up questionnaires using a repeated measures analysis of variance (ANOVA). Where sphericity was violated, Greenhouse-Geisser was used (Blanca et al., 2023). Within-group effect sizes were calculated from baseline to pre-treatment, pre-treatment to post-treatment and pre-treatment to 3-month follow-up using Cohen's d and were interpreted as 0.2 (small effect), 0.5 (medium effect) and 0.8 (large effect) (Cohen, 1988).

Clinical significance was analysed in three ways. Firstly, change in diagnostic status from baseline to post-treatment and baseline to 3-month follow-up was assessed using the DIAMOND. Secondly, clinically significant change was defined as reliable change according to the

Jacobson and Truax (1991) reliable change index criteria using the formula:

$$RCI = \frac{x_2 - x_1}{S_{diff}}$$

The RCI thresholds for reliable change were 6.74 for the SIAS-6 and 5.33 for the SPS-6. Reliable deterioration was defined as an increase in symptoms by the RCI magnitude. Finally, clinically significant change (CSC) at pre-treatment, post-treatment and 3-month follow-up was defined as meeting the RCI and having a SIAS-6 score below 7 and an SPS-6 score below 2 (Peters et al., 2012).

The vImR protocol was compared with standard in-person ImR treatment by benchmarking effect sizes with data available from an existing meta-analysis of in-person ImR for SAD (Kroener et al., 2023). Benchmarking was also completed with data from a meta-analysis of in-person CBT (Hall et al., 2024), and a recent vCBT RCT (Winter et al., 2025). Benchmarking analyses followed the methodology outlined by Minami et al. (2008) whereby differences in rate of change are considered clinically trivial if within a margin of ±0.2 of the standardized mean difference. This methodology has been utilised in previously published studies (Trenoska Basile et al., 2024; Wootton et al., 2018, 2021).

3. Results

3.1. Adherence and attrition

A total of 31 participants (31/35; 88.6 %) were considered to have completed treatment, defined as completing at least 6 of 8 treatment sessions. Questionnaires were completed by 30/35 (85.7 %) of participants at post-treatment, and 26/35 (74.3 %) of participants at follow-up. Little's Missing Completely at Random test indicated that data was likely missing at random (χ^2 (442) = 171.09, $p = 1.00$). DIAMOND interviews were completed by 31/35 (88.6 %) of participants at post-treatment, and 25/35 (71.4 %) of participants at follow-up. Overall, the average number of sessions completed was 6.99 (SD = 1.93). There were no significant differences between those who completed treatment ($N = 31$) and those who dropped out ($N = 4$) based on demographic variables including age, gender, medication, employment status, education, or pre-diagnostic severity (all p's > 0.05). Adherence to the treatment was rated on a 0–10 scale, with 0 indicating no adherence to the treatment protocol and 10 indicating complete adherence with the treatment protocol. The mean score was 8.86 ($SD = 1.56$), with a range of 4–10.

3.2. Symptom change

Baseline, pre-treatment, mid-treatment, post-treatment, and 3-month follow-up estimated marginal means and standard deviations, as well as p-values for each comparison on the primary and secondary outcomes measures are outlined in Table 2. Effect sizes with 95 % confidence intervals are outlined in Table 3.

3.2.1. Primary outcome measures

For both primary outcome measures there was a significant Time effect (SIAS-6: $F_{4,\ 88.82} = 9.40$, $p < 0.001$; SPS-6: $F_{4,\ 94.89} = 7.82$, $p < 0.001$), with no significant change from baseline to pre-treatment, and significant reductions from pre-treatment to post-treatment and pre-treatment to follow-up.

3.2.2. Secondary outcome measures

On the secondary outcome measures there was a significant Time effect (SAD-D: $F_{4,\ 84.45} = 13.55$, $p < 0.001$; PHQ-9: $F_{4,\ 86.68} = 2.62$, $p = 0.04$; CGI: $F_{4,\ 80.92} = 9.99$, $p < 0.001$; SDS: $F_{4,\ 84.24} = 8.87$, $p < 0.001$), with no significant change from baseline to pre-treatment, and significant reductions from pre-treatment to post-treatment and pre-treatment to follow-up; except for on the PHQ-9 whereby the treatment effect did not appear to be durable from pre-treatment to follow-up.

3.3. Sensitivity analysis

A repeated measure analysis of variance was used to examine baseline, pre-treatment, mid-treatment, post-treatment, and 3-month follow-up means and standard deviations for the completer sample at follow-up ($N = 26$) on the primary and secondary outcomes measures, and effect sizes with 95 % confidence intervals are outlined in Supplement Table A. The results of the sensitivity analyses were very similar to the intention-to-treat (ITT) analyses. These are outlined in full in the Supplement.

3.4. Clinical improvement and deterioration

3.4.1. Diagnostic change

Diagnostic change was measured at post-treatment and 3-month follow-up. When using the last observation carried forward method where diagnostic status was assumed to be consistent with the last assessment 23/35 (65.7 %) participants no longer met criteria for SAD at post-treatment and 26/35 (74.3 %) no longer met criteria at follow up. When using the completer data 23/31 (74.2 %) participants no longer met diagnostic criteria for SAD and 22/25 (88.0 %) participants no longer met criteria at 3-month follow up.

3.4.2. Reliable change and deterioration

Using Jacobson and Truax's (1991) Reliable Change Index (RCI) at post-treatment, 6/30 (20.0 %) met the RCI criteria and 0/37 (0 %) deteriorated on the SIAS-6. At 3-month follow-up, 7/27 participants (26.9 %) met the RCI criteria and 0/27 (0 %) deteriorated. On the SPS-6 at post-treatment, 15/30 participants (50.0 %) met the RCI criteria and 1/30 (3.3 %) deteriorated. At 3-month follow-up, 15/26 participants (57.7 %) met the RCI criteria and 1/26 (3.8 %) deteriorated.

Table 2
Estimated marginal means, standard deviations and p values for each comparison for total sample.

Measure	Mean (SD)					*p-value*		
Measure	Baseline	Pre-treatment	Mid-treatment	Post-treatment	Follow-up	Baseline to pre-treatment	Pre-treatment to post-treatment	Pre-treatment to follow-up
SIAS-6	13.37 (4.23)	12.37 (4.69)	10.23 (4.18)	8.84 (3.95)	8.28 (4.89)	0.35	0.001	<0.001
SPS-6	12.71 (5.64)	12.86 (5.58)	10.67 (5.85)	8.25 (5.98)	7.66 (5.96)	0.79	0.001	<0.001
SAD-D	20.94 (6.60)	18.77 (7.93)	14.55 (8.17)	11.51 (6.61)	9.85 (8.37)	0.22	<0.001	<0.001
PHQ-9	8.40 (5.31)	9.00 (4.81)	7.84 (5.22)	6.68 (4.93)	7.75 (5.71)	0.69	0.05	0.33
CGI-Severity	4.03 (1.11)	3.71 (0.99)	3.13 (1.08)	2.68 (1.14)	2.68 (1.08)	0.21	<0.001	<0.001
SDS	16.83 (5.05)	14.80 (5.71)	11.14 (7.42)	10.37 (6.31)	9.29 (7.42)	0.12	0.003	<0.001

Note. SIAS-6: Social Interaction Anxiety Scale (6-item), SPS-6: Social Phobia Scale (6-item), SAD-D: Social Anxiety Disorder Dimensional Scale (10-item), PHQ-9: Patient Health Questionnaire (9-item), CGI: NIMH Clinician Global Impression, SDS: Sheehan Disability Scale, effect sizes (Cohen's d) were calculated based on pooled standard deviations, CI: confidence intervals.

Table 3
Effect sizes (Cohen's d) for total sample.

Measure	Within Group Effect sizes (95 % CI)		
	Within-group baseline to pre-treatment	Within group pre-treatment to post-treatment	Within group pre-treatment to follow-up
SIAS-6	0.22 (−0.25–0.69)	0.81 (0.32–1.29)	0.85 (0.36–1.33)
SPS-6	−0.03 (−0.49–0.44)	0.80 (0.30–1.27)	0.90 (0.40–1.38)
SAD-D	0.30 (−0.18–0.77)	0.99 (0.49–1.48)	1.09 (0.58–1.58)
PHQ-9	−0.12 (−0.59–0.35)	0.48 (0.00–0.95)	0.24 (−0.24–0.70)
CGI-Severity	0.30 (−0.17–0.77)	0.96 (0.46–1.45)	0.99 (0.49–1.48)
SDS	0.38 (−0.10–0.85)	0.74 (0.24–1.21)	0.83 (0.34–1.31)

Note. SIAS-6: Social Interaction Anxiety Scale (6-item), SPS-6: Social Phobia Scale (6-item), SAD-D: Social Anxiety Disorder Dimensional Scale (10-item), PHQ-9: Patient Health Questionnaire (9-item), CGI: NIMH Clinician Global Impression, SDS: Sheehan Disability Scale, effect sizes (Cohen's d) were calculated based on pooled standard deviations, CI: confidence intervals.

3.4.3. Clinically significant change

Clinically significant change (CSC) was defined as meeting the RCI criteria and scoring below the identified cut-score on the SIAS-6 and SPS-6. 3/30 participants (10.0 %) met criteria for CSC at post-treatment and 6/26 participants (23.1 %) met criteria for CSC at 3-month follow up on the SIAS-6. On the SPS-6, 4/30 participants (13.3 %) met criteria for CSC at post-treatment and 5/26 participants (19.2 %) met criteria for CSC at 3-month follow up.

3.5. Benchmarking analysis

Table 4 outlines the effect sizes on the primary outcome measures (SIAS-6 and SPS-6) as well as the SAD-D compared with a meta-analysis of in-person delivered brief ImR for SAD (Kroener et al., 2023). This meta-analysis did not include follow-up analysis, and all included comparisons incorporated only 1–2 sessions of ImR. When examining the effect size from the Kroener et al. (2023) study ($g = 0.72$) which included nine comparisons, the effect sizes on all social anxiety measures at post-treatment in the current study compare favourably. The SIAS-6 and SPS-6 were clinically trivial, however when examining the SAD-D, the effect size in the current study ($d = 0.99$) is significantly higher than the effect size seen in in-person ImR studies ($g = 0.72$) (Kroener et al., 2023). Benchmarking comparisons were also made against in-person CBT (Hall et al., 2024) and a recent RCT of vCBT (Winter et al., 2025). Again, vImR yielded clinically similar results to CBT delivered both in-person and remotely via videoconferencing-delivered treatment. When benchmarking participant attrition between 8-sessions of vImR and 8-sessions of vCBT, both treatment approaches yielded similar results. Attrition in vImR was 11.4 %; attrition in vCBT was 10.8 %.

Table 4
Effect sizes (Cohen's d) with 95 % CI for total sample.

Sample	Effect Sizes
	Post-treatment
vImR (current study)	
SIAS-6	0.81 (0.32–1.29) [a]
SPS-6	0.80 (0.30–1.27) [a]
SAD-D	0.99 (0.49–1.48) [a]
In-person ImR (Kroener et al., 2023)	0.72 (0.47–0.97) [a b]
In-person CBT (Hall et al., 2023)	0.95 (0.35–1.28) [b c]
vCBT (Winter et al., 2025)	
SIAS-6	0.95 (0.45–1.41) [a]
SPS-6	0.82 (0.33–1.28) [a]
SAD-D	1.34 (0.82–1.83) [a]

Note.
[a] Within-group.
[b] Hedge's *g*.
[c] Between-group.

3.6. Treatment satisfaction and acceptability

The mean score on the CSQ at post-treatment was 29.33 (SD = 2.75). Of those who completed the post-treatment questionnaires, 29/30 (96.7 %) participants reported they were "satisfied" or "very satisfied" with the treatment, and 28/30 (93.3 %) stated they would recommend the treatment to a friend.

4. Discussion

The present study aimed to examine the acceptability and efficacy of vImR for SAD using a multiple baseline design utilising the waitlist control group from a larger RCT examining vCBT for SAD (Winter et al., 2025). Overall, the study had three hypotheses: (1) vImR will result in significant reductions in social anxiety symptoms, resulting in large within-group effect sizes from pre-treatment to post-treatment and pre-treatment to follow-up; (2) vImR for SAD will result in similar reductions to standard in-person ImR; and (3) vImR will be acceptable to individuals with SAD. These hypotheses were supported.

Using conservative ITT principles, the primary measures indicated that vImR significantly reduces symptoms of social anxiety. This was evident through non-significant changes from baseline to pre-treatment, where no treatment was provided, and large within-group effect sizes from pre-treatment to post-treatment on the SIAS-6 ($d = 0.95$) and the SPS-6 ($d = 0.85$). Further, large effect sizes were also found from pre-treatment to 3-month follow-up on the SIAS-6 ($d = 0.85$) and the SPS-6 ($d = 0.90$). On secondary measures of symptom severity including the SAD-D and CGI, small effect sizes were found from baseline to pre-treatment and large effect sizes were found from pre-treatment to post-treatment (SAD-D: $d = 0.99$; CGI: $d = 0.96$) and pre-treatment to 3-month follow-up (SAD-D: $d = 1.09$; CGI: $d = 0.99$).

Given this is the first trial of vImR for SAD and vImR more broadly, there is currently no existing vImR literature to compare our results. However, it is noteworthy that symptom reduction resulting from vImR compare similarly to in-person ImR for SAD as observed in the benchmarking analyses. When compared to the Kroener et al. (2023) study, which included nine RCTs of in-person delivered ImR for individuals with SAD (Hedge's $g = 0.72$) we found similar effect sizes on both the SIAS-6 ($d = 0.81$) and SPS-6 ($d = 0.80$). We found stronger effect sizes on the SAD-D ($d = 0.99$). However, it is important to note the differences in ImR delivery between the present study and the studies included in the Kroener et al. (2023). Firstly, the included RCTs in Kroener et al. (2023) predominantly delivered a single session of ImR. Secondly, three of the RCTs also included cognitive restructuring in the intervention, which was not an incorporated in the present study. Thirdly, the present study utilised the waitlist control group from a larger study which is of methodological significance and discussed in depth in the limitations of the present study. Collectively, although further research into the efficacy of vImR is required, our preliminary research indicates that ImR and vImR result in similar outcomes, and that eight sessions of vImR treatment may be more beneficial than 1–2 sessions. These results

provide preliminary evidence to suggest that vImR is capable of engaging detailed and meaningful imagery-based mental simulations that meet the needs with adaptive self-schemas, changing negative beliefs and reduce social anxiety symptoms.

The present study was also benchmarked against a meta-analysis of in-person CBT (Hall et al., 2024). Although the present study isolated ImR treatment from multi-component interventions (e.g., cognitive restructuring and/or graded exposure typically included in a course of CBT), it yielded similarly large effect sizes to in-person CBT interventions (Hedges' $g = 0.95$; Hall et al., 2024). Although it should be noted that Hall et al. (2024) reported between-group effect sizes, and within-group effect sizes are typically larger. Further, a recent RCT of eight sessions of vCBT also reported clinically similar effect sizes (Winter et al., 2025) to those found in the present study. Attrition in vImR was also remarkably similar to vCBT (Winter et al., 2025) with 11.4 % participants in the vImR treatment and 10.8 % of participants in the vCBT treatment lost across the same number of sessions. vImR may be appropriate as a second-line treatment alternative when CBT has not been effective, as an adjunct to CBT, or as a first-line treatment for individuals for whom socially aversive experiences and associated memories are particularly salient. This is important as negative self-schemas in SAD are proposed as an important maintaining factor of the disorder, and are known to be often resistant to updating using CBT protocols (Rapee et al., 2009). However, further research is required to investigate the efficacy of vImR in controlled trials when compared to first-line treatment.

Interestingly, the present study provided only modest effects on depressive symptoms, with small effect sizes observed from pre-treatment to post-treatment ($d = 0.48$) and pre-treatment to follow-up ($d = 0.24$) on the PHQ-9. Although the treatment did not specifically address depressive symptoms which often co-occur for individuals with SAD (Arditte et al., 2016), mean rates of depression appeared to remain stable within the mild range (Kroenke et al., 2001) from pre-treatment to post-treatment. This outcome is surprising as ImR is often shown to benefit comorbid depressive symptoms (Boterhoven De Haan et al., 2020; Kroener et al., 2023), appears to be a promising transdiagnostic treatment approach (Kip et al., 2023), and is used as a disorder specific intervention for depression (Brewin et al., 2009; Ma & Lo, 2022; Wheatley & Hackmann, 2011). It is possible that the memories targeted in the present study, which were strictly related to negative social experiences, may be different to those targeted in studies of ImR for depression, and that those participants who did not experience a decrease in depressive symptom severity required additional sessions to address more complex needs resulting from comorbid depressive disorders.

In terms of diagnostic change, 65.7 % of participants no longer met criteria for SAD at post-treatment (74.2 % for the completer sample), and 74.3 % no longer met criteria at follow-up (88.0 % for the completer sample). Currently, there is scant literature available to compare diagnostic change observed in the present study to other studies of ImR for SAD. However, using CBT as a comparison, the present study compares favourably. A meta-analysis of remission rates in CBT studies reported that approximately 40 % of participants experience diagnostic change at post-treatment, and 43 % at follow-up (45 % for completer samples) (Springer et al., 2018). Thus, diagnostic change from vImR appears higher than that seen in CBT, however further research is required.

The Jacobson and Truax (1991) RCI at post-treatment and follow-up also revealed symptom reduction beyond the possibility of error. At post-treatment 20 % of participants met the RCI criteria on the SIAS-6 and 50 % on the SPS-6. At follow-up, 26.9 % of participants met the RCI criteria on the SIAS-6 and 57.7 % of participants on the SPS-6. CSC was met from 10 % of participants on the SIAS-6 at post-treatment and 13.3 % on the SPS-6. This increased at follow-up with 23.1 % of participants meeting CSC on the SIAS-6 and 19.2 % on the SPS-6. Notably, in the present study the CSC criteria required a score of ≤ 7 on SIAS-6 and ≤ 2 on SPS-6 consistent with the cut scores outlined by Peters et al. (2012). However the authors of the SIAS-6 and SPS-6 indicate that these cut scores are generally less sensitive than the longer version of the SIAS and SPS (Peters et al., 2012). The SPS-6 cut-off of <2 in particular may be difficult to obtain in a clinical sample. For example, a large non-clinical sample of undergraduate students ($n = 3607$) found a mean of 5.71 ($SD = 5.06$) on the same measure (Carleton et al., 2014). Therefore, the CSC outcomes should be considered with caution. However, it is interesting to consider that the SPS-6 targets specific fears of being scrutinized such as drawing attention to oneself, compared to the SIAS-6 which focuses on broader social interaction anxieties such as making eye contact and conversing with others. When taken at face value, the RCI suggests that the vImR intervention in this sample produced stronger reliable change on fear of scrutiny over the general anxiety associated with social interactions, which are the type of fears that develop following specific experiences of peer victimisation, exclusion and humiliation that are purported to cause SAD (Norton & Abbott, 2017).

Importantly, acceptability of vImR was high in this sample. Of participants who completed treatment and the post-treatment questionnaire, 96.7 % reported they were either "satisfied" or "very satisfied" with treatment, and 93.3 % of participants stated they would recommend the treatment to a friend. Acceptability of vImR was also seen through low dropouts. Overall, 88.6 % of participants completed the full course of treatment. Only three participants dropped out of the study (8.6 %), and one participant was withdrawn from the study as their primary diagnosis became apparent at a later date. Of the three participants who dropped out, two withdrew due to time constraints, and one withdrew as they did not feel they could raise memories and work in imagery. Although we are unable to compare these results to other videoconferencing-delivered ImR treatments, it is aligned with the high acceptability and low attrition of other large in-person ImR studies (e.g., Boterhoven De Haan et al., 2020; Reiss et al., 2017). Thus, vImR appears to be highly translatable to the remote videoconferencing treatment environment.

Finally, as this was the first eight session treatment protocol for ImR that we are aware of, it is worthwhile reviewing themes that emerged across participants during ImR. Consistent with etiological models of SAD (e.g., Spence & Rapee, 2016), situational themes of retrieved memories included humiliation from peers, family members or teachers, bullying and ostracism, invalidation and emotional abuse and neglect from parents/caregivers, and occasionally physical and/or sexual abuse. Rescripts for most participants were targeted towards a consolidated time period, typically between the formative years of early childhood to late adolescence. Prominent core beliefs or schemas included themes of the self as defective, unworthy, and inferior, not belonging or fitting in, and others as untrustworthy and judgemental (Dobinson et al., 2020). When intervening in phase 2, participants tended to focus on compassion towards their younger self, fulfilling the unmet emotional needs, as well as assertiveness towards the perpetrator. However, we observed that providing compassion, support, and guidance to the parent or caregiver in the rescript to facilitate better parenting was often more effective than scolding or assertiveness (e.g., providing validation to the parent or caregiver that they were experiencing difficulty themselves and providing counselling on how to fulfil the core needs of the child participant). Consistent with Romano et al. (2021), we did not experience avoidance as a key strategy from participants. Most phase 2 interventions were completed by participants themselves, at times with the help of the therapist to guide and role model possible strategies. We noted that no participant enacted any magical interventions (e.g., flying away on a magic carpet, or becoming a wizard character and using magic). Overall, it was evident that within the procedure of ImR, there was considerable variation in the memories that were rescripted and the strategies used to successfully shift the meanings embedded in these memories.

4.1. Research limitations

The present study has several limitations which are relevant to future research. Firstly, this was an uncontrolled trial design, therefore we were unable to compare vImR to any other outcome such as a waitlist control or a more established treatment such as CBT. Future research should examine the efficacy of vImR compared to other treatments using RCT designs. It is also recommended that future research compare the efficacy of vImR as an additive to components of CBT for SAD, such as cognitive restructuring and graded exposure within an RCT design.

Secondly, this study used the WLC of a previous RCT which has potential implications for the findings. Following the waitlist period of 8-weeks, participants were not re-assessed for diagnostic status before treatment commenced. It is therefore possible that some participants experienced spontaneous remission and no longer met criteria for SAD at pre-treatment, as has been observed in SAD samples in other studies (Scott et al., 2022). Furthermore, there is evidence that use of a WLC does not necessarily reflect the natural course of symptoms among those awaiting treatment (Mohr et al., 2009), and that 'no treatment' does not equate with 'no effect' (Furukawa et al., 2014; Patterson et al., 2016). Consequently, participants in this sample may have been influenced by the experience of the waitlist. For example, this could include expectancy effects such as experiencing either symptom improvement in anticipation of treatment, or symptom exacerbation resulting from no longer engaging in health reinforcing activities (Furukawa et al., 2014; Mohr et al., 2009), or reduced satisfaction due to frustration and disappointment during the waiting period (Patterson et al., 2016). These factors could have biased the observed treatment effects, potentially inflating or underestimating the efficacy of vImR as found in the present study, as well as impacting the acceptability ratings. Future research should therefore initiate treatment immediately following randomisation to minimise any expectancy and methodological confounds.

Thirdly, during the diagnostic screening process, participants were not assessed for personality disorders (e.g., avoidant personality disorder). It is possible that some participants met criteria for these presentations, and it is well known that treatment requirements for personality disorders are more substantial than what was provided (Van Den End et al., 2021, 2024). For example, although there are some similarities between SAD and avoidant personality disorder (Reich, 2014), treatment requirements of SAD and avoidant personality disorder differ in their intensity and length of treatment period due to the higher level of symptom severity and dysfunction (Weinbrecht et al., 2016).

Fourthly, while the majority of participants in the present study identified as female, which is consistent with the gender distribution of SAD (Asher et al., 2017), there were very few non-binary participants, and participants were highly educated on average (i.e., more than half the sample were tertiary educated). Therefore, there may be some limitations on generalisability to wider samples of individuals with SAD. It is important for this study to be replicated with a more representative distribution of genders and educational attainment.

Finally, as the memories targeted in the present study were strictly related to negative social experiences, it would be valuable for future research to compare ImR associated with a specific memory target (e.g., social scrutiny) with ImR where the theme of the target memory is not prescribed. In this case, the target memories would be associated with the current symptoms as perceived by the patient through use of an 'affect bridge technique'. It is possible a more restrictive target memory results in larger but more specific effects.

4.2. Conclusion

The present study examined the acceptability and efficacy of vImR for SAD in the first known remote treatment study for ImR. Using a multiple baseline design, the study has demonstrated that vImR appears to be acceptable to individuals with SAD and provides preliminary evidence of the efficacy of vImR as a standalone treatment for SAD. Benchmarking analyses also indicated that vImR may result in outcome that are similar to in-person ImR, in-person CBT and vCBT. While further research is required, the results of this study have important implications for the delivery of psychological treatments for SAD, indicating that vImR may be another available evidence-based treatment option.

CRediT authorship contribution statement

Halaina R. Winter: Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Alice R. Norton:** Writing – review & editing, Supervision, Methodology, Conceptualization. **Bethany M. Wootton:** Writing – review & editing, Supervision, Methodology, Conceptualization.

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Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Halaina Winter reports financial support was provided by Australian Psychological Society Ltd. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.brat.2025.104914.

Data availability

Data will be made available on request.

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